

Status of the Claims

Claims 1, 3, 4, 6-8, and 11 are pending.

Claim 1 has been amended to more clearly define the invention and obviate the rejection under 35 U.S.C. § 112.

Claims 2, 5 and 12 have been canceled.

Claims 3 and 4 have been amended.

Claims 6 and 11 were previously presented.

Claims 7, 8, and 10 are original claims

Claim 9 has been withdrawn.

Election /Restriction Requirement

Claim 9 was withdrawn from consideration as being directed to a non-elected invention by the Examiner.

Rejections – 35 USC § 112

Claims 1, 3-4, 6-8 and 10-11 were rejection under 35 USC § 112, second paragraph for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The claims have been amended to clearly point out that the material applied as the covering layer over the substrate absorbs high energy radiation provided by NIR applied in the second step of the process in the range of 250-2500 nm and is heated at a rate of more than 50 C. The wave length range and the heating rates are necessary for the process according to the invention using the NIR radiation in step b). The select group of materials of step a) serve no other purpose than in connection with step b) of Applicants process. The select material of step a) is applied to cover the surface of the substrate and upon heating with NIR melts and cures the powder coating composition applied in step b) of the process. The whole concept of the invention is to provide short curing times to provide excellent adhesion of the coating to the substrate and provide a coating with a good appearance.

The above explanation and amendments to the claims should obviate the '112 rejections of the office action.

Claim Rejections – 35 USC § 103

Obviousness Rejection over Blatter et al. and Nickerson

Claims 1, 3-4, 7-8 and 10-11 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Applicants' admitted state of the art, Blatter et al. (WO 99/41323) further in view of Nickerson (US 3,860,506).

The admitted state of the art according to the previous office action are paragraphs 5 and 6 of the specification (page 2, lines 4-10) which pointed out that coating non-conductive substrates with powder coating is difficult due to the insufficient grounding of the substrate and that the deposition of a powder coating is uneven and adhesion to the substrate is poor and that it is known to pretreat based substrates with a liquid conductive primer. This admitted prior art does not disclose or suggest Applicants' invention as set forth in the amended claims which requires a first layer of constituents which are not taught, application of a powder coating and curing with NIR which is also not taught.

There is no disclosure or suggestion in this admitted prior art or Blatter that would lead one to apply a first layer of a material that is either carbon, magnetite, iron oxide black, tin oxide or antimony oxide as has been set forth in the amended claims. These materials as an applied first layer on a substrate are not taught nor is the concept of applying a first layer suggested by Blatter or the admitted prior art. Nickerson discloses the use of graphite a layer to improve adhesion. Graphite has been deleted in the amended claims since this is the only constituent that was disclosed by Nickerson.

Blatter simply discloses a process for applying a powder coating composition to substrates including temperature sensitive substrates and curing with NIR radiation but does not disclose or suggest the use of the first layer of material set forth in the amended claims. As pointed previously and in the specification, this first layer provides a shortened melting and curing time of the powder coating and the powder coating melts to provide a smooth and uniform surface coating and the process can be used on a wide variety of substrates, metallic, non metallic,

conductive, non-conductive, temperature sensitive and insensitive substrates. (See specification page 3, line 6-14).

Nickerson is directed to forming a conductive coating on non-conductive substrates and this conductive coating is based on graphite which is the only material disclosed by Nickerson. This conductive coating (graphite) is coated onto a substrate and heated to a high sintering temperature of, for example 1700 C for more than 4 hours (temperature is raised from ambient to 1700 C in 20 minutes and is maintained at this temperature for 4 hours) to form a sintered conductive coating. (See Nickerson, col. 9, lines 37-60.) Nickerson discloses a conductive coating but is in combination with a totally different process which utilizes sintering at high temperatures for long periods of time which would obviously destroy any heat sensitive substrate, such as, wood or plastic. One of the particular advantages of Applicants' process is that it can be used on such substrates. Further, Nickerson is directed to the application of zirconium oxide – yttrium oxide protective coatings and not organic powder coatings as set forth in the specification page 5, lines 20-31. One skilled in the art would not select this solution taught by Nickerson to apply powder coatings and cure them with NIR.

Further, Nickerson only teaches the use of graphite and the particular constituents set forth in Applicants' amended claims are not taught or suggested by Nickerson and the claims have been amended to specifically exclude graphite. In view of the above discussion, one skilled in the art would not logically combine the teachings of Nickerson and Blatter to arrive at Applicants' claimed invention. Even if the combination were made which is not taught or suggested by either references, one still would not arrive at Applicants' claim process but a process that requires the sintering of graphite not used by Applicants which would destroy any temperature sensitive substrate used in such a process. In contrast, Applicants' by the use of the particular constituents of the first layer as set forth in the claims with NIR can use their process of a variety of substrates and in particular temperature sensitive substrates.

In view of the above discussion which clearly shows the inadequacies of Nickerson, Applicants again point out Table 1 on page 8 of the specification which shows the surprising and unexpected results of Applicants' invention in comparison

to the prior art, such as Blatter. The powder coating compositions prepared in Examples 1 and 2 were applied to two separate aluminum substrates, one did not have a carbon coating layer and the second did have a carbon coating layer on the aluminum substrate and is representative of the invention. As shown by the data, adhesiveness, flow, impact resistance and flexibility of the cured powder coating on the aluminum panel having the carbon layer were superior to the cured powder coating on the aluminum panel that did not have the carbon layer. Further, the curing time using NIR radiation was more than double for the panel without the carbon layer. This experiment clearly shows that physical properties and curing times of powder coatings applied according to the process of Applicants' invention are superior to those applied by prior techniques such as those taught by Blatter.

The obviousness rejection based on the admitted state of the art, Blatter and Nickerson must be withdrawn and the claims allowed.

Obviousness Rejection Over Blatter, Nickerson and Honda

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted state of art in view of Blatter, further in view of Nickerson and further in view of Honda et al. (US 6,800,374). The admitted state of art, Blatter and Nickerson have been discussed above and their deficiencies will not be repeated.

Honda is totally irrelevant to Applicants' invention since Honda is directed to forming a cleaning tape and has no relation to the application of a powder coating composition which is Applicants claimed invention. Honda simply shows adjusting the thickness of a carbon layer forming a conductive film. Honda is not directed to a process for applying a powder coating to a substrate that has been coated with a material as set forth in the amended claims that improves the physical properties of the powder coating layer and reduces the curing time using NIR radiation.

The obviousness rejection based on Blatter, Nickerson, and Honda needs to be withdrawn and the claim allowed.

Response to Examiner's Comments in Regard to Applicants' Arguments

The Examiner stated that any material can be heated at the claimed rate of 50 C or more if very thin by using intense energy (e.g. thousands of very powerful UV lamps). (See par. 13 of the office action.) Such use of intense energy would

destroy any heat sensitive substrate, such as, wood or plastics. One of the important advantages of Applicants' process is that it can be used on such heat sensitive substrates. Further, Applicants do not use just any material but only those set forth in the amended claims that will heat rapidly on exposure to NIR and serve to melt and cure the powder coating into a smooth uniform finish. None of the cited references even suggest that this can be done.

In par. 9 of the previous office action, the claims were rejected over Blatter. Therefore, the experimental data in Table 1, page 8 of the specification is pertinent in regard to Blatter since the data does show surprising and unexpected results and superior properties of coatings applied according to Applicants' process in comparison to a process such as disclosed by Blatter that does not use the first layer of the specific heat absorbing components set forth in the amended claims.

Summary

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. In order to expedite disposition of this case, the Examiner is invited to contact Applicants' representative at the telephone number below to resolve any remaining issues. If there are any fees due, please charge them to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

Respectfully submitted,



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